

WHAT WE CLAIM ARE:

1. A polysilicon etching method comprising steps of:
  - preparing a semiconductor substrate having an insulating film with a protrusion formed on one principal surface of said substrate and a polysilicon layer deposited on said insulating film and covering the protrusion;
  - forming a resist layer on the said polysilicon layer, said resist layer having a predetermined pattern not covering at least a portion of side walls of the protrusion;
  - performing a first plasma etching process of etching said polysilicon layer by using mixture gas of HBr and Cl<sub>2</sub> and said resist layer as a mask to leave said polysilicon layer having a pattern corresponding to said resist layer and polysilicon residues made of a portion of said polysilicon layer on the side walls of the protrusion; and
  - performing a second plasma etching process of removing the polysilicon residues by using single gas of HBr and said resist layer as a mask.
2. A polysilicon etching method according to claim 1, wherein said second plasma etching process is performed at a pressure in a range of 5.0 to 10.0 mTorr.
3. A polysilicon etching method according to claim 1, wherein said second plasma etching process is performed under a condition that an etching selection ratio of said polysilicon layer to said insulating film is in a range of 20 to 40.
4. A polysilicon etching method according to claim 3, wherein said second

plasma etching process is performed at a radio frequency bias power in a range of 10 to 20 W.

5. A polysilicon etching method according to claim 1, further comprising a step  
5 of performing a third plasma etching process after removing the polysilicon residues, said third plasma etching process being an over-etching process using said resist layer as a mask and mixture gas of HBr or Cl<sub>2</sub>, and O<sub>2</sub> as etching gas.